



New Jersey Department of Health and Senior Services

# HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **CARBONYL SULFIDE**

CAS Number: 463-58-1  
DOT Number: UN 2204

RTK Substance number: 0349  
Date: August 1988 Revision: September 1998

## HAZARD SUMMARY

- \* **Carbonyl Sulfide** can affect you when breathed in and may be absorbed through your skin.
- \* **Carbonyl Sulfide** can irritate and even burn the skin and eyes. Contact with the liquified gas may cause frostbite.
- \* Breathing **Carbonyl Sulfide** can irritate the nose and throat causing coughing and sneezing.
- \* Breathing **Carbonyl Sulfide** can irritate the lungs causing coughing and/or shortness of breath. Higher exposures can cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.
- \* High exposure can cause nausea, vomiting, weakness and muscle cramps. It may cause the heart to beat fast (tachycardia) or irregular (arrhythmia).
- \* High or repeated exposure may affect the nervous system causing headache, dizziness, and confusion with memory problems. Higher concentrations can cause unconsciousness, convulsions, coma, sudden collapse and even death.
- \* **Carbonyl Sulfide** may damage the brain.
- \* **Carbonyl Sulfide** is HIGHLY FLAMMABLE and a DANGEROUS FIRE HAZARD.

## IDENTIFICATION

**Carbonyl Sulfide** is a colorless gas or a cold liquid. It is used to make other chemicals and viscose rayon. It is also a by-product of petroleum refining and coal processing.

## REASON FOR CITATION

- \* **Carbonyl Sulfide** is on the Hazardous Substance List because it is cited by DOT, NFPA, DEP, EPA and HHAG.
- \* Definitions are provided on page 5.

## HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- \* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.20.
- \* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

## WORKPLACE EXPOSURE LIMITS

No occupational exposure limits have been established for **Carbonyl Sulfide**. This does not mean that this substance is not harmful. Safe work practices should always be followed.

- \* It should be recognized that **Carbonyl Sulfide** can be absorbed through your skin, thereby increasing your exposure.

## WAYS OF REDUCING EXPOSURE

- \* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- \* Wear protective work clothing.
- \* Wash thoroughly immediately after exposure to **Carbonyl Sulfide** and at the end of the workshift.
- \* On skin contact with liquified **Carbonyl Sulfide**, immediately submerge the affected body part in warm water.
- \* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Carbonyl Sulfide** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

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## HEALTH HAZARD INFORMATION

### Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Carbonyl Sulfide**:

- \* **Carbonyl Sulfide** can irritate and even burn the skin and eyes. Contact with the liquified gas may cause frostbite.
- \* Breathing **Carbonyl Sulfide** can irritate the nose and throat causing coughing and sneezing.
- \* Breathing **Carbonyl Sulfide** can irritate the lungs causing coughing and/or shortness of breath. Higher exposures can cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.
- \* High exposure can cause salivation, nausea, vomiting, diarrhea, sweating, weakness, and muscle cramps. It may cause the heart to beat fast (tachycardia) or irregular (arrhythmia).

### Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Carbonyl Sulfide** and can last for months or years:

### Cancer Hazard

- \* According to the information presently available to the New Jersey Department of Health and Senior Services, **Carbonyl Sulfide** has not been tested for its ability to cause cancer in animals.

### Reproductive Hazard

- \* According to the information presently available to the New Jersey Department of Health and Senior Services, **Carbonyl Sulfide** has not been tested for its ability to affect reproduction.

### Other Long-Term Effects

- \* High or repeated exposure may affect the nervous system causing headache, dizziness, and confusion with memory problems. Higher concentrations can cause unconsciousness, convulsions, coma, sudden collapse and even death.
- \* **Carbonyl Sulfide** may damage the brain causing reduced memory, inability to concentrate, and/or personality changes (e.g., irritability).
- \* **Carbonyl Sulfide** can irritate the lungs. Repeated exposure may cause bronchitis to develop with cough, phlegm, and/or shortness of breath.

## MEDICAL

### Medical Testing

Before beginning employment and at regular times after that, for those with frequent or potentially high exposures, the following are recommended:

- \* Evaluate for brain effects such as changes in memory, concentration, sleeping patterns and mood (especially irritability and social withdrawal), as well as headaches and fatigue. Consider evaluations of the cerebellar, autonomic and peripheral nervous systems. Positive and borderline individuals should be referred for neuropsychological testing.

If symptoms develop or overexposure is suspected, the following may be useful:

- \* EKG.
- \* Complete nervous system evaluation.
- \* Consider chest x-ray after acute overexposure.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.20.

## WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following controls are recommended:

- \* Where possible, automatically transfer **Carbonyl Sulfide** from cylinders or other storage containers to process containers.
- \* Before entering a confined space where **Carbonyl Sulfide** may be present, check to make sure that an explosive concentration does not exist.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- \* Workers whose clothing has been contaminated by **Carbonyl Sulfide** should change into clean clothing promptly.
- \* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Carbonyl Sulfide**.
- \* Eye wash fountains should be provided in the immediate work area for emergency use.
- \* If there is the possibility of skin exposure, emergency shower facilities should be provided.
- \* On skin contact with **Carbonyl Sulfide**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Carbonyl Sulfide**, whether or not known skin contact has occurred.
- \* Do not eat, smoke, or drink where **Carbonyl Sulfide** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating or smoking.

## PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

### Clothing

- \* Avoid skin contact with **Carbonyl Sulfide**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide glove/clothing material for your operation.
- \* Where exposure to cold equipment, vapors, or liquid may occur, employees should be provided with special clothing designed to prevent the freezing of body tissues.
- \* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

### Eye Protection

- \* Wear non-vented, impact resistant goggles when working with fumes, gases, or vapors.
- \* Wear indirect-vent, impact and splash resistant goggles when working with liquids.
- \* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.
- \* Contact lenses should not be worn when working with this substance.

### Respiratory Protection

**IMPROPER USE OF RESPIRATORS IS DANGEROUS.** Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- \* Engineering controls must be effective to ensure that exposure to **Carbonyl Sulfide** does not occur.
- \* Where the potential for overexposure exists, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

## HANDLING AND STORAGE

- \* Prior to working with **Carbonyl Sulfide** you should be trained on its proper handling and storage.
- \* **Carbonyl Sulfide** must be stored to avoid contact with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE) since violent reactions occur.
- \* Store in a tightly closed, secure container in a cool, well-ventilated area away from STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE) and HUMIDITY.
- \* **Carbonyl Sulfide** can form explosive mixtures with AIR.
- \* Sources of ignition, such as smoking and open flames, are prohibited where **Carbonyl Sulfide** is handled, used, or stored.
- \* Metal containers involving the transfer of **Carbonyl Sulfide** should be grounded and bonded.
- \* Use only non-sparking tools and equipment, especially when opening and closing containers of **Carbonyl Sulfide**.
- \* Wherever **Carbonyl Sulfide** is used, handled, manufactured, or stored, use explosion-proof electrical equipment and fittings.

## QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.
- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill

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The following information is available from:

New Jersey Department of Health and Senior Services  
Occupational Disease and Injury Services  
PO Box 360  
Trenton, NJ 08625-0360  
(609) 984-1863  
(609) 292-5677 (fax)

Web address: <http://www.state.nj.us/health/eoh/odisweb/>

### **Industrial Hygiene Information**

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

### **Medical Evaluation**

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Disease and Injury Services, who can help you find the information you need.

### **Public Presentations**

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

### **Right to Know Information Resources**

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

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## DEFINITIONS

**ACGIH** is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

**DEP** is the New Jersey Department of Environmental Protection.

**DOT** is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

**EPA** is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

**HHAG** is the Human Health Assessment Group of the federal EPA.

**IARC** is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

**mg/m<sup>3</sup>** means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

**MSHA** is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

**NAERG** is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

**NCI** is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

**NFPA** is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

**NIOSH** is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

**NTP** is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

**OSHA** is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

**PEOSHA** is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

**ppm** means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

**TLV** is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

**FOR LARGE SPILLS AND FIRES** immediately call your fire department. You can request emergency information from the following:

CHEMTREC: (800) 424-9300  
NJDEP HOTLINE: (609) 292-7172

## HANDLING AND STORAGE (See page 3)

## FIRST AID

- In NJ, POISON INFORMATION 1-800-764-7661*

\* Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids. Seek medical attention.

- \* Quickly remove contaminated clothing. Immediately wash area with large amounts of soap and water. Seek medical attention immediately.
- \* In case of worker exposure to liquified gas, immerse affected part in warm water. Seek medical attention.

If liquid **Carbonyl Sulfide** is spilled or leaked, take the following steps:

- \* Evacuate persons not wearing protective equipment from area of spill or leak until clean-up is complete.
- \* Remove all ignition sources.
- \* Ventilate area of spill or leak and allow to vaporize.

- \* Remove the person from exposure.
- \* Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- \* Transfer promptly to a medical facility. Effects may be delayed. Overexposed persons should be observed medically for at least 24 hours.

If gaseous **Carbonyl Sulfide** is leaked, take the following steps:

- \* Restrict persons not wearing protective equipment from area of leak until clean-up is complete.
- \* Remove all ignition sources.
- \* Ventilate area of leak to disperse the gas.
- \* Stop flow of gas. If source of leak is a cylinder and the leak cannot be stopped in place, remove the leaking cylinder to a safe place in the open air, and repair leak or allow cylinder to empty.
- \* Keep **Carbonyl Sulfide** out of a confined space, such as a sewer, because of the possibility of an explosion, unless the sewer is designed to prevent the build-up of explosive concentrations.
- \* It may be necessary to contain and dispose of **Carbonyl Sulfide** as a HAZARDOUS WASTE. Contact your Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.
- \* If employees are required to clean-up spills, they must be properly trained and equipped. OSHA 1910.120(q) may be applicable.

## PHYSICAL DATA

**Vapor Pressure:** 9,412 mm Hg at 77°F (25°C)

**Water Solubility:** Soluble

## OTHER COMMONLY USED NAMES

**Chemical Name:**

## Carbon Oxide Sulfide

**Other Names:**

Carbon Monoxide Monosulfide; SCO; Carbon Oxysulfide

*Not intended to be copied and sold for commercial purposes.*

NEW JERSEY DEPARTMENT OF HEALTH AND  
SENIOR SERVICES

## Right to Know Program

PO Box 368, Trenton, NJ 08625-0368  
(609) 984-2202